



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,394	04/09/2004	Anders Landin	5181-95101	1590

58467 7590 10/09/2007
MHKKG/SUN
P.O. BOX 398
AUSTIN, TX 78767

EXAMINER

PATEL, KAUSHIKKUMAR M

ART UNIT	PAPER NUMBER
----------	--------------

2188

MAIL DATE	DELIVERY MODE
-----------	---------------

10/09/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/821,394

Applicant(s)

LANDIN ET AL.

Examiner

Kaushikkumar Patel

Art Unit

2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/12/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to applicant's communication filed July 09, 2007 in response to PTO Office Action mailed March 08, 2007. The applicant's remarks and amendments to the claims and/or specification were considered with the results that follow.
2. In response to last Office Action, claims 1, 3-5, 8, 11, 12, 15-18, 21, 24-26, 28, 31, 33, 34, 37, 40 and 44 have been amended. No claims have been canceled. No claims have been added. As a result, claims 1-44 remain pending in this application.

Response to Arguments

3. Applicant's arguments filed July 09, 2007 have been fully considered but they are not persuasive.

In view of objections to specification under 35 U.S.C. 112, first paragraph, applicant mentioned paragraphs [0189] and [0191], but those paragraph mere defines what is proxy read to share/own/invalidate (i.e. PRTS, PRTO and PI) packets or where it is used, but as explained in the objection, the particular embodiment is not described in the specification, such as with respect to PRTS as mentioned in remarks section (pages 14, 15) with respect to paragraphs [0249] to [0255]. Applicant notes paragraphs [0189], [0191], [0250], [0255], [0260], [0261] and [0272] teaches various packets (i.e. PRTS, PRTO and PI0, but the examiner is able find only PRTS, wherein the active device ignore the packet even though it is owner (or has ownership responsibility).

Art Unit: 2188

Paragraphs [0260] and [0261] are for speculative transactions and does not support the condition of checking the global access state (i.e. if the global access state of the coherency unit is in modified state or not), because the speculative transactions such as PRT0 is initiated regardless of global access state of the coherency units as explained in paragraphs [0256] to [0264], thus the objection to specification is maintained.

Applicant also argues that specification defines the “owner” but it does not state the owner provides the data (remarks pages 12, 14) and then amended the claims with “ownership responsibility” but again the definition from specification is clear and one having ordinary skill in the art will understand that the ownership responsibility or owner is same and it should provide the data. This is clear from specification par. [0090], where paragraph [0090] states, “The ownership responsibility specified by the state information for a particular coherency unit indicates whether the client device is responsible for providing a copy of the coherency unit to another client that requests it.”

A client device owns (i.e. has ownership) a coherency unit if it is responsible for providing data to another client which requests that coherency unit”. From above paragraph, it is clear that the owner or the device that has ownership responsibility provides data to the requester. It is also further evident from related description of claim 1 of the present application. See paragraph [0249], “However, memory may be configured to not to respond to requests unless it is the owner of the requested coherency unit”, where it is readily apparent that owner responds to the coherency requests. Thus, the objection to specification and previous rejection of claims under 35 U.S.C. 112, first paragraph is maintained, because applicant himself provides

contradictory statements, i.e. "the definition language merely states the owner has responsibility for that function", "the definition is merely defining who is responsible for providing the data in given situations" (remarks, page 12, last par.). It is clear from applicant's own assertion, that device with ownership responsibility is responsible for providing data, as it is clear from above arguments, but the owner ignores the packet.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on July 12, 2007 has considered by the examiner.

Specification

5. 35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms, which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are:

No where in the specification, the specifics of proxy read-to-own (PRTTO) packets and proxy invalid (PI) packets are described, where the active device even though is owner, ignores the second type of packets as claimed in claims 1, 15, 31 and 44 (similar to PRTS explained in paragraphs [0249] – [0255]).

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-44 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Independent claims 1, 15, 31 and 44 recite the limitation “if the given active device has an ownership responsibility of the coherency unit”, the definition of “owner” or “ownership responsibility” as per present application specification par. 90, “The ownership responsibility specified by the state information for a particular coherency unit indicates whether the client device is responsible for providing a copy of the coherency unit to another client that requests it. A client device owns (i.e. has ownership) a coherency unit if it is responsible for providing data to another client which requests that coherency unit”. Accordingly from prior two statements the “owner” or device with “ownership responsibility” is responsible for providing the requested coherency unit and the claim limitation recites ignoring the address packet, so the specification and claim language contradicts each other.

As per claims 7-12, 20-25 and 36-41, the limitations “proxy read-to-own” packet (PRTO) and “proxy invalidate” packet (PI) is not described in the specification.

According to present application specification, pars. 189 and 191, "a PRT0 packet may be used to initiate a similar (to PRT0 modified) sub transactions in non-gM node" and "a PI is a similar (to PI modified) invalidating request used to invalidate data in caches and/or memory in a gl or gS node". The claims are dependent claims and the respective parent claims recites limitation "if the active device is owner of the coherency unit...ignore the second type (PRT0 and PI) of packets" accordingly it is not clear, if the packets are used to initiate similar transactions, such as PRT0 to gain read-to-own access and PI to invalidate the access right, then if the active device ignores the packets, then at the execution of PRT0 packet creates two owners (because the original owner ignores the PRT0 packet) and use of PI packet do not invalidate the access rights of the owner.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-44 rejected under 35 U.S.C. 103(a) as being unpatentable over Rowlands (US 2003/0217216).

In view of the ambiguities stated above Rowlands appears to teach limitations of claims 1-44.

As to claims 1 and 2, Rowlands teaches a system, comprising:

a node (Rowlands, fig. 2, item 10A-10D) including one or more active devices (Rowlands, fig.1, items 12A-12N), an interface (Rowlands, fig. 2, item 20) and an address network configured to transmit address packets between the one or more active device and the interface (Rowlands, pars. [0041], [0042], [0047]);

an additional node coupled to the node by an inter-node network, wherein the additional node includes an additional address network (Rowlands, fig. 2).

With respect to remaining limitations of claims, such as sending first type of address packets and second type of address packets depending upon the global states the applicant's disclosure is failed to properly describe such packets as explained above with respect to rejection of claims under indefiniteness and Rowlands teaches a multi-node system with dual level of coherency (e.g. at intra-node level coherency and inter-node coherency), with inter-node (global access states) coherency comprises modified, shared or invalid states and intra-node coherency comprises MESI or other type of coherency states. He also teaches when the cache block having inter-node coherency (i.e. global access state) as modified state, active devices within the node can have read and write access to the cache block, if the inter-node coherency state of the block is shared state, then active devices within the node can have read access right and invalid state, the device may not read or write (i.e. no valid copy of data). (Rowlands, par. [0035]). Rowlands further teaches that a single transaction (command) may be used for probes or there may be a probe generated transaction that invalidates agent copies of the cache block and another probe-generated transaction that permits agents to retain shared copies of the cache block (Rowlands, par. [0058]). Thus, from above

teaching one having ordinary skill in the art at the time of the invention would have used first type of packet in case of inter-node cache state having modified to acquire read access to coherency unit, which can force write back of modified data from the active device having ownership of the data and send second type of packet if the inter-node state of the block is shared state, where the second type of packet forces owning device or other device having data in shared state (in shared inter-node state the maximum access right is read-only, as such data in the active device as well as in the memory are same data (i.e. valid)) to send data to requesting node but permits agents to retain shared copies of data.

With respect to limitation, wherein in if given active device has ownership responsibility for the coherency unit, the given active device is configured to ignore the second type of packet and respond to first type of packet, it is understood that when the inter-node coherency state is in modified state, the active device must write-back data to memory, as such active device responds to the first type of packet and if the global state (inter-node state) is shared state, then the data at memory is valid and as such data can be retrieved from memory, which is equivalent to ignoring the second type of packet, where it is readily apparent that either memory or the active device responds to the second type of packet.

As to claims 3-6, the claims recites read-to-share packets to gain shared access right to coherency units and transitioning of ownership or not, Rowlands teaches read-shared and read-exclusive commands to obtain data in either shared state or exclusive state (Rowlands, par. [0056]) and as explained above with respect to inter-node and

Art Unit: 2188

intra-node coherency, one having ordinary skill in the art at the time of the invention would have realized that when data was in modified state at one node and other node wants share the data, then the inter-node state is changed from modified to shared and the modified data must written back to memory, thus satisfying either transitioning ownership or not if data at inter-node state is in shared-state.

Claims 7-9, recite read-to-own (readexc) packets as well as proxy-read-to-own packets, Rowlands as explained above with respect to claims 3-6 teaches similar transactions (Rowlands, par. [0056]) and also proxy packets (e.g. probe packets, pars. [0058] – [0065]) thus satisfying limitations of claims 7-9. It is also readily apparent from Rowlands, that in response to read-to-own packets, the node holding exclusive copy of data sends data to requester and transitions its global state to invalid, and requester's state to modified, indicating transitioning of access rights.

Claims 10-12 recite, invalidate packets, Rowlands teaches invalidating packets of a node providing data in response to requester's read-to-own (readexc) packets (par. [0058]).

As to limitations of claims 13 and 14, use of directory less (broadcasting) and directory protocols are known in the art and depending upon the configuration of system one having ordinary skill in the art would have used point-to-point type of protocol in the system containing large number of device to reduce the traffic or would have used broadcasting in system having smaller number of device to reduce the overhead of maintaining directory.

Claims 15-44 are also rejected under same rationales as applied to claims 1-14 above.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rowlands US 2004/0034747 teaches a packetized link to transport coherency messages and also teaches maintaining coherency between inter-node and intra-node states.

11. The examiner also requests, in response to this Office action, support be shown for language added to any original claims on amendment and any new claims. That is, indicate support for newly added claim language by specifically pointing to page(s) and line no(s) in the specification and/or drawing figure(s). This will assist the examiner in prosecuting the application.

12. When responding to this office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present, in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections See 37 CFR 1.111(c).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaushikkumar Patel whose telephone number is 571-272-5536. The examiner can normally be reached on 8.00 am - 4.30 pm.


Art Unit: 2188

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hyung Sough can be reached on 571-272-6799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


kmp

Kaushikkumar Patel
Examiner
Art Unit 2188


HYUNG SOUGH
SUPERVISORY PATENT EXAMINER
10/01/07